

**IN THE CLAIMS:**

Please cancel claims 1-29 and 32-33, without prejudice as directed to a non-elected invention. This listing of claims will replace all prior versions, and listings, of claims in the application.

**LISTING OF CLAIMS**

Claim 1-29. (Canceled)

30. (Currently Amended) A polymer scaffold microfabricated by a method comprising comprising:

generating of an elastomer mold;  
directing a polymer into the mold;  
curing the polymer in the mold to form a ~~two-dimensional~~ polymer scaffold;  
and  
removing the cured polymer scaffold from the mold.

31. (Currently Amended) A microfabricated polymer scaffold comprising a ~~continuous~~ membrane comprised of a surface with varying topology.

Claims 32-33. (Canceled)

34. (New) The polymer scaffold of claim 30, wherein the elastomer is selected from the group consisting of a silicone polymer, a poly(dimethylsiloxane) (PDMS) and an epoxy polymer.

35. (New) The polymer scaffold of claim 30, wherein the polymer is a biopolymer.

36. (New) The polymer scaffold of claim 30, wherein the polymer is selected from the group consisting of poly(DL-lactic acid) (PLA), poly(DL-lactic-co-glycolic acid) (PLGA) and poly(L-lactic acid) (PLLA).

37. (New) The polymer scaffold of claim 30, wherein the polymer is a hydrogel.

38. (New) The polymer scaffold of claim 37, wherein the hydrogel comprises polyethylene glycol, polyethylene oxide, polyvinyl alcohol, polyvinyl pyrrolidone, polyacrylates, poly (ethylene terephthalate), poly(vinyl acetate), and copolymers and blends thereof.

39. (New) The polymer scaffold of claim 30, further comprising coating the cured polymer scaffold with a substance selected from the group consisting of biomolecules, peptides and proteins that modulate cell adhesion.

40. (New) The polymer scaffold of claim 39, wherein the substances promote cell adhesion.

41. (New) The polymer scaffold of claim 40, wherein the substance is selected from the group consisting of collagen, fibronectin, vitronectin, Arg-Gly-Asp (RGD) and Tyr-Ile-Gly-Ser-Arg (YIGSR) peptides, glycosaminoglycans (GAGs), hyaluronic acid (HA), integrins, selectins and cadherins.

42. (New) The polymer scaffold of claim 39, wherein the substances inhibit cell adhesion.

43. (New) The polymer scaffold of claim 42, wherein the substances comprise triblock polymers.

44. (New) The polymer scaffold of claim 39, wherein the substances are selected from a list consisting of pluronics, surfactants, bovine serum albumin, poly hydroxyethylmethacrylate, polyacrylamide, and polymethymethacrylate.

45. (New) The polymer scaffold of claim 30, further comprising inducing porosity by contacting the polymer with a particulate leaching agent.

46. (New) The polymer scaffold of claim 45, wherein the particular leaching agent is selected from the group consisting of sugar, salt and protein.

47. (New) The polymer scaffold of claim 37, further comprising assembly of two or more cured polymer scaffolds to each other to provide a layered polymer scaffold.

48. (New) The method of claim 23, further comprising the attachment of the two dimensional structures to each other by applying mechanical pressure and heating.
49. (New) The polymer scaffold of claim 30, further comprising contacting the polymer scaffold with cells.
50. (New) The microfabricated polymer scaffold of claim 31, wherein the membrane comprises a biopolymer.
51. (New) The microfabricated polymer scaffold of claim 50, wherein the biopolymer is selected from the group consisting of poly(DL-lactic acid) (PLA), poly(DL-lactic-co-glycolic acid) (PLGA) and poly(L-lactic acid) (PLLA).
52. (New) The microfabricated polymer scaffold of claim 50, wherein the biopolymer is a hydrogel.
53. (New) The microfabricated polymer scaffold of claim 52, wherein the hydrogel comprises polyethylene glycol, polyethylene oxide, polyvinyl alcohol, polyvinyl pyrrolidone, polyacrylates, poly (ethylene terephthalate), poly(vinyl acetate), and copolymers and blends thereof.
54. (New) The microfabricated polymer scaffold of claim 31, further comprising coating the membrane with a substance selected from the group consisting of biomolecules, peptides and proteins that modulate cell adhesion.
55. (New) The microfabricated polymer scaffold of claim 54, wherein the substances promote cell adhesion.
56. (New) The microfabricated polymer scaffold of claim 55, wherein the substance is selected from the group consisting of collagen, fibronectin, vitronectin, Arg-Gly-Asp (RGD) and Tyr-Ile-Gly-Ser-Arg (YIGSR) peptides, glycosaminoglycans (GAGs), hyaluronic acid (HA), integrins, selectins and cadherins.
57. (New) The microfabricated polymer scaffold of claim 54, wherein the substances inhibit cell adhesion.

58. (New) The microfabricated polymer scaffold of claim 57, wherein the substances comprise triblock polymers.
59. (New) The microfabricated polymer scaffold of claim 54, wherein the substances are selected from a list consisting of pluronics, surfactants, bovine serum albumin, poly hydroxyethylmethacrylate, polyacrylamide, and polymethymethacrylate.
60. (New) The microfabricated polymer scaffold of claim 31, wherein the membrane is porous.
61. (New) The microfabricated polymer scaffold of claim 31, wherein the membrane is a mesh.
62. (New) The microfabricated polymer scaffold of claim 31, wherein the membrane comprises a plurality of membranes.
63. (New) The microfabricated polymer scaffold of claim 31, further comprising cells attached to the membrane.
64. (New) The polymer scaffold of claim 37, wherein the hydrogel comprises cells.